

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

MEMORANDUM ON AN EXAMINATION OF THE BARK BEETLE
INFESTATION AND CONTROL OPERATION ON THE
GREEN MOUNTAIN NATIONAL FOREST

By
M. W. Blackman

And

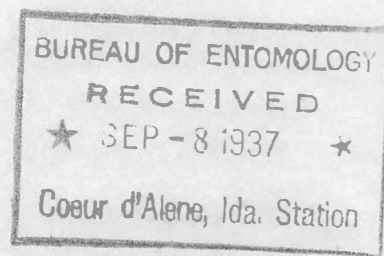
SPRUCE BARK-BEETLE INFESTATIONS ON GREEN
MOUNTAIN NATIONAL FOREST

By
W. D. Bedard
Assistant Entomologist

Bureau of Entomology & Plant Quarantine
Washington, D. C.
Sept. 2, 1937

Information of
Mr W D. Bedard

September 2, 1937



Mr. T. A. Silcox,

Chief, Forest Service

Dear Mr. Silcox:

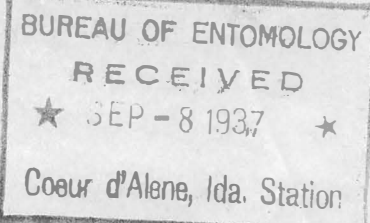
For your information two reports are enclosed covering examinations of the bark-beetle infestation on the Green Mountain National Forest. One of these was made by Mr. W. D. Bedard of our Coeur d'Alene Lab., who came in here at Forest Service expense to train crews in the use of chemicals; the other report covers an examination on the progress of the work recently conducted by Dr. M. W. Blackman of this Bureau.

During the past summer we have had a man detailed to the area for nearly full time to help out on technical features pertaining to control.

From the latest survey information examined by Dr. Blackman, there is apparently much new infestation occurring and it does not seem to be declining as rapidly as reported at the time of Mr. Bedard's examination. It will be necessary to push control activities very aggressively in view of this development. We also recommend that the use of chemicals be discontinued and that peeling or burning be used from now on according to weather conditions.

Very truly yours,

Avery S. Hoyt
Acting Chief of Bureau



MEMORANDUM ON AN EXAMINATION OF THE BARK BEETLE
INFESTATION AND CONTROL OPERATION ON THE
GREEN MOUNTAIN NATIONAL FOREST

August 25 and 26 were spent in an examination of the infestation of the eastern spruce beetle (D. piceaperda) on the Northern District of the Green Mountain National Forest.

August 25 was spent on Mount Ellen about 30 miles by auto from Rochester, Vermont. The infestation is on the top of Mt. Ellen and nearest approach by road is 3-1/2 to 4 miles from the center of infestation. In this area about 100 trees of considerable size are infested. The area is very inaccessible and for that reason was not logged off when the rest of spruce in area was out. Most of the trees are over-mature and decadent. Many show lightning injury and frost cracks extending up 15-30 feet on the bole and many trees have two or more such injuries. Also many of the trees show spiral grain and as the injuries follow the grain such trees are often worthless as saw logs.

Quite a few of these trees are so decadent that the bark on one side is often dead while the other side was infested this season. Such trees as might be expected show very erratic distribution of the copper sulfate and it is very questionable if a good kill will be obtained. Mr. Schaffner is very pessimistic regarding results.

In this area the felled material showed eastern spruce beetle infestation on one side, while the other half was dead and infested with Dryocoetes affaber. The D. piceaperda brood was mostly in the prepupa, pupa and pale yellow, callow adult stage. It is believed that there will be little or no emergence from such material this season.

There was no evidence of blue stain seen in these trees, only a slight yellowish discoloration of the outermost sapwood. This was not in definite bands but in small streaks or spots.

On August 26 we visited the "Bingo" area nearer Rochester. Here approach could be made to within a half mile of the edge of the infestation. The trees here were in much better condition for although many were overmature, comparatively few showed the lightning injuries and frost cracks characteristic of the Mt. Ellen area. Spruces varied from 10" to 26" DBH.

In this area two trees were felled for examination. One was a tree which had received the chemical treatment ten days previously. This had a green top and was very lightly infested by the beetles. Most of the attacks had been pitched-out, and it is believed that this tree would have survived the beetle attack.

This tree showed an excellent distribution of the copper sulfate which could be detected, usually, to a depth of 1/2 inch in the sapwood of the trunk. Also twigs broken from the topmost branches 85 feet from the ground showed distinct streaks of green.

Another untreated tree about 24" in diameter was felled and examined very thoroughly. The first 20 feet was very heavily infested and counts of brood showed a population of 100 or more per square foot. Of this about 95% was in the young adult stage, the prevailing color being light chestnut brown. A few pupae and very few prepupae were also seen.

A small amount of blue stain was visible in this tree. It was grey in color and the distribution in cross-section was not that characteristic of blue stains in pine. There was no peripheral band with radii extending inward but just a few isolated islands.

Above 20 feet, up to the extent of the D.p. infestation which ended at 37 feet, the brood was younger, but still the majority were in the callow adult stage, a few larvae and considerable number of pupae were also present.

The lowermost position of this tree may have been attacked late last summer, and there is a possibility that the more advanced brood might emerge and attack this fall. There is also a chance that if such advanced brood is freed by treatment by the peeling method this fall, the beetles may be capable of attacking and killing trees.

As the peeling method of control is the one recommended for treatment this fall, it was thought best to determine by experiment if such a danger exists. The felled tree therefore was barked and the bark allowed to fall as in a control operation. A living tree 10" diameter was felled and cut up into four foot lengths and these were placed at various distances and directions from the barked tree. This experiment is to determine whether or not these half-colored young beetles will attack green bark. If so, the treatment by peeling will be ineffective against the farther advanced brood.

It was recommended that the chemical treatment of trees be discontinued for the rest of this season, and that the main reliance be placed on the felling and peeling method. The foresters objected to the amount of inflammable slash thus created and showed a preference for the burning method, but of course, cannot practice this until after snow-fall. They may shift to the burning method as soon as fire conditions will allow it and even spoke of the possibility of preparing the trees for burning and returning after snowfall to finish the operation. I am afraid that this will slow down the treatment and run up the cost.

The conditions under which the work is carried on are not of the best. The CCC boys all live in the main camp, travel by trucks as near to the infestation as possible and then go through the woods to the infestation. In the Mt. Ellen area this means 30 miles by truck, 3-1/2 - 4-1/2

miles up the mountain to the infestation. They have only a 6 hour day, and going to and from work uses so much of this time, that on Mt. Ellen only about 2-1/2 hours of effective work per day could be performed.

The crew at present on this work is 32 boys. Most of these are recent enrollees and as yet are not very efficient.

The question of spike camps was discussed, but the forest officers think there is little prospect of their being allowed to use these, due to CCC rules regarding water supply, sanitation, etc.

Also the question of employing local labor was discussed, and here also they have not as yet received authority for such employment. Some of the forest officers felt that if such authority were granted, the work could be carried on more efficiently.

The scouting work, carried on by Mr. Hyson and a crew of CCC men seems to have been very efficiently done. The survey is more than a 5% survey and is more nearly a 10-15% survey, with 100% in several of the heavily infested areas. A great deal of the area appears to show from 1/4 to 1/10 trees per acre, or less and it is very likely that such areas will not receive treatment unless they show a considerable increase next summer. The full results of this survey should be available soon, but Hyson's duties are so heavy that all summaries

and reports must be prepared after hours. While the complete results of the survey are not yet available it is apparent that in some areas at least, new infestation has appeared since the earlier survey in July. Thus a survey line in one area made July 19 showed 38 infested trees, while a later survey made August 13 showed 37 additional trees, making a total of 75 trees.

It was recommended that, in several additional areas where the survey lines showed more than average infestation, that additional lines be run to determine whether or not such areas should be treated immediately.

M. W. Blackman
August 30, 1937

SPRUCE BARK-BEETLE INFESTATIONS ON GREEN MOUNTAIN
NATIONAL FOREST

The following memorandum gives a resumé of my activities and recommendations regarding the spruce bark-beetle infestation on the Green Mountain National Forest, and summarizes the plan of work which has been tentatively outlined for the remainder of the season.

I left Coeur d'Alene, Idaho on July 1 and arrived in New Haven, Connecticut, on July 4, but because of the holidays was unable to make connections with the New Haven Laboratory until July 6. After discussing the project with Mr. Brown, Mr. Schaffner and I left for Rochester, Vermont, stopping enroute to meet with Supervisor Koenig of the Green Mountain Forest. We arrived in Rochester on July 7 and spent the remainder of the day examining one of the spruce areas. July 8, 9, 10 and 12 were spent in other areas in company with Mr. Harry Hyson, who conducted the 1936 survey and who is in active charge of the 1937 project.

These preliminary examinations were for the purpose of familiarizing myself with the situation, and to select an area in which infested trees were well concentrated so as to facilitate the injection work. It was at once apparent, however, that there was a decided scarcity of 1937-attacked trees in all but the Falls Brook drainage. This apparent reduction in the infestation led to further examination to determine the abundance of emergence from the 1936

trees, the status of the infestation in other areas, etc. The main points which were established from these days of preliminary examination are as follows:

1 - The spruce type on the Green Mountain National Forest rarely occurs as pure stands, and then only over limited areas. Spruce usually is found in scattered patches or pockets, intermixed with hardwoods. Although the spruce in some of these areas has been severely depleted by the spruce barkbeetle, a few areas have been but lightly infested.

2 - Forest Service lands are not only adjacent to private spruce holdings, but are intermixed with them as well.

3 - With the exception of the Falls Brook drainage, very few 1937-attacked trees were found. Examination of trees, which could definitely be determined as having been attacked during 1936, showed no living broods and but few emergence holes, with extremely abundant work by secondary bark-beetles.

4 - The survey made during the winter of 1936-37 was well conducted on a 20-percent basis, and showed an average infestation of 0.5 tree per acre on approximately 22,000 acres. In discussing this survey with Mr. Hyson, however, it was decided that this infestation figure might be somewhat inflated owing to the fact that some trees were counted from which all beetles had emerged.

5 - A limited amount of control work had been done during the winter of 1936-1937, by decking and burning the infested trees.

These examinations indicated, therefore, that it was neces-

cessary to learn the status of the 1937 infestation, not only on Forest Service land, but also on adjacent private lands as well, in order to ascertain the number of trees to be treated and the extent of the infested area. To this end, a survey crew was started on July 16. The activity of this crew will be discussed later under the tentative work program.

It was understood that as many trees as possible were to be treated by tree injection in order to ascertain the success of this method in controlling the spruce bark-beetles. Accordingly, on July 13, one spotting crew was started in the Falls Brook drainage, which was the most promising of all areas examined. Treating was not begun until July 17 because the rubberized cloth did not arrive until July 16.

Tentative Work Program

Control

One 7-man spotting crew has been engaged in locating trees which were attacked by the spruce bark-beetle during 1937, and one 6-man treating crew has been engaged in treating these trees. This work will continue until (1) no more infested trees are available or (2) it is found that the attacked trees have deteriorated to such an extent that the copper sulfate solution is no longer being conducted.

In the event that the survey shows other areas needful of control, these crews can be transferred to the new areas when the Falls Brook project has been completed. If injection is no longer

feasible when the new areas are to be treated, the treating crew can be turned into a spotting crew and thus areas to be treated can be spotted and ready for treatment when burning conditions permit.

It is to be realized, of course, that the number of crews depends on the size of the area to be treated. A safe estimate of the Daily Acreage per crew in the Green Mountain Forest is difficult to make, owing to decided variations in travel time. If additional crews are to be added, however, they should be organized in the same manner as present crews, and should be under the direction of a capable foreman.

Research

Mr. Schaffner of the New Haven Laboratory, will care for all of the investigative work. He will determine the time when injection is no longer feasible by testing the trees periodically at various heights with potassium ferrocyanide reagent. He will also take charge of arranging a schedule of dosages to determine the most effective amount of copper sulfate and he will later examine the trees to ascertain the mortality secured.

Survey

At the present time, the survey is being conducted by one 4-man crew which is making between a 5 and 10 percent survey. It is recommended, however, that at least one more similar crew be added and that the survey be extended as far as possible outside the forest boundaries. It is appreciated that the Rochester CCC camp is at minimum strength and that competent foremen are difficult to secure. It

is imperative, however, that a thorough knowledge be secured concerning the extent of the infestation unit, as well as the amount of infestation within this area, before control recommendations can be made.

The data secured from this survey will be assembled, summarized and submitted to Dr. F. C. Craighead, who will then determine the need for additional control work.

Personnel

For the most effective operation of all crews, it is necessary that insofar as possible no personnel changes be made once the crews have been organized. It is realized that illness and leave will necessitate some changes, but it should not be necessary to be continually faced with the task of instructing green men.

W. D. Bedard